April 6, 2017 - Thursday

7:00-7:10 am  | Welcome and Opening Comments  
Jonathan Grauer, MD

Session #1  | Blood Loss / Thromboembolism
Moderators: Andrew Daily, MD and Thomas A. Zdeblick, MD
(7:10-7:37)

7:10-7:15 Paper 1  | Efficacy and Safety of High-dose Tranexamic Acid Protocol in Adult Spinal Deformity – Analysis of 100 Consecutive Cases  
James Lin, MD, MS; Jamal Shillingford, MD; Joseph Laratta, MD; Lee Tan, MD; Charla Fischer, MD; Ronald Lehman, MD; Lawrence Lenke, MD

7:16-7:21 Paper 2  | Comparison of Bleeding vs. Clotting Complications after Lumbar Spine Surgery  
Haroutioun Boyajian, MD; Olumuyiwa Idowu, BA; William Mosenthal, MD; Lewis Shi, MD; Michael Lee, MD

7:22-7:27 Paper 3  | Pharmacologic Prophylaxis for Venous Thromboembolism in Elective Spine Surgery  
Ryan McLynn, BS; Patawut Bovonratwet, BS; Nathaniel Ondecho, BS; Jonathan Cui, BS; Taylor Ottesen, BS; Blake Shultz, BA; Jonathan Grauer, MD

7:27-7:37  | DISCUSSION

Session #2  | Infections
Moderators: Paul Arnold, MD and Don Moore, MD
(7:37-8:04)

7:37-7:42 Paper 4  | Fever Following Lumbar Fusion Procedures  
Fady Hijji, BS; Ankur Narain, BA; Daniel Bohl, MD, MPH; Benjamin Mayo, BA; Dustin Massel, BS; Krishna Kedaravalli, BS; Kelly Yom, BA; Kern Singh, MD

7:43-7:48 Paper 5  | Betadine Irrigation and Intrawound Vancomycin Powder Prevent Wound Complications Following Lumbosacral Tumor Surgery.  
Addisu Mesfin, MD

7:49-7:54 Paper 6  | Outcomes of Suprafascial Vacuum Assisted Closure Device in Spine Surgical Site Infections Management  
Swamy Kurra, MBBS; Richard Tallarico, MD; Mike Sun, MD; William Lavelle, MD

7:54-8:04  | DISCUSSION

Session #3  | Complications
Moderators: Jonathan Sembrano, MD and Bartoz Wojewnik, MD
(8:04 - 8:37)

8:04-8:09 Paper 7  | Can a surgeon’s demographic factors predict postoperative complication rates after an elective spinal fusion?  
Gurmit Singh, BS; Danielle Chun, MD; Ralph Cook, BS; Joseph Weiner, BS; Michael Schallmo, BS; Kathryn Barth, BS; Sameer Singh, BS; Ryan Freshman, BS; Alpesh Patel, MD, FACS; Wellington Hsu, MD
8:10-8:15 Paper 8  Adverse Events following Posterior Lumbar Fusion: A Comparison of Spine Surgeons Perceptions at LSRS and Reported Data for Rates and Risk Factors  
Nathaniel Ondeck, BS; Daniel Bohl, MD, MPH; Patawut Bovonratwet, BS; Ryan McLynn, BS; Jonathan Cui, BS; Andre Samuel, BBA; Matthew Webb, AB; Jonathan Grauer, MD

8:16-8:21 Paper 9  Rates of Mortality Among Lumbar Spine Surgical Procedures and Factors Associated with its Occurrence Over a Ten Year Period: A Study of 803,949 Patients on the Nationwide Inpatient Sample  
Gregory Poorman, BA; John Moon, BS; Samantha Horn, BA; Olivia Bono, BA; Anna-Marie Francis, BA; Cyrus Jalalai, BA; Peter Passias, MD

8:22-8:27 Paper 10  Inaccuracies in ICD Coding for Obesity Bias Toward Higher Frequency of Coding in Patients with Increased Comorbidities and Correlate with Postoperative Complications: A Limitation for Spine Studies Using Administrative Databases  
Ryan McLynn, BS; Benjamin Geddes, MD; Jonathan Cui, BS; Nathaniel Ondeck, BS; Patawut Bovonratwet, BS; Blake Shultz, BA; Jonathan Grauer, MD

8:27-8:37 DISCUSSION

SYMPOSIUM #1  Trauma – AOSpine

Moderators:  Jens Chapman, MD

(8:37-9:22)

8:37-8:47  A fresh approach to classifying Spine Trauma: the new AO TL fracture classification system.  
Gregory Schroeder, MD

8:47-8:52  Discussion

8:52-9:02  Posttraumatic TL kyphosis – when does it matter?  
Christopher Shaffrey, MD

9:02-9:07  Discussion

9:07-9:17  Recent insights in recovery from TL SCI. The results of STASCIS and NACTN databanks  
Jefferson Wilson, MD

9:17-9:22  Discussion

9:22-9:42  BREAKOUT POSTER SESSION -1

9:22-9:42  BREAKOUT POSTER SESSION -1

Moderators:  Bradford Currier, MD and Leo Spector, MD

9:22-9:24 Poster 1  Trends in Primary and Revision Laminectomy in the United States from 2006 to 2014  
Comron Saifi, MD; Joseph Laratta, MD; Andrew Pugely, MD; Alejandro Cazzulino, BA; Edward Goldberg, MD; Ronald Lehman, MD; Lawrence Lenke, MD; Howard An, MD; Frank Phillips, MD;  
9:24-9:26  DISCUSSION

9:27-9:29 Poster 2  90-day reimbursements for primary single level posterior lumbar interbody fusion from commercial and Medicare data  
Nikhil Jain, MD; Frank Phillips, MD; Safdar Khan, MD

9:29-9:31  DISCUSSION

9:32-9:34 Poster 3  Development of Common Language Descriptions Correlating with PROMIS  
Jason Ferrel, MD; Chong Zhang, MS; Angela Presson, PhD; Rasheed Abiola, MD; Nicholas Spina, MD; W. Ryan Spiker, MD; Brandon Lawrence, MD; Darrel Brodke, MD

9:35-9:37  DISCUSSION
9:37-9:39 Poster 4 PROMIS Physical Function Outcomes in Diabetic Patients Undergoing Lumbar Spine Surgery
Mathieu Squires, BS, Ashley Neese, BS, Yue Zhang, PhD, Brandon Lawrence, MD; W. Ryan Spiker, MD; Darrel Brodke, MD

9:40-9:42 DISCUSSION

Session #4 Rapid Fire Presentations: General Spine
Moderators: Ira Goldstein, MD and Kevin Baker, PhD
(9:42-10:31)

9:42-9:44 RF Paper 1 The Effectiveness of Bioskills Module for Simulated Lumbar Pedicle Screw Instrumentation
Sohail Hashmi, MD; Barrett Boody, MD; Joseph Maslak, MD; Michael McCarthy, MD; Alpesh Patel, MD, FACS; Wellington Hsu, MD

9:45-9:47 RF Paper 2 Resident Involvement as a Risk Factor in Anterior Lumbar Fusion Outcomes
Samantha Jacobs, BA; William Ranson, BS; Chierika Ukogu, BA; Jun Kim, MD; John Di Capua, MHS, BS; Sulaiman Somani, BS; Luilly Vargas, BSN; Samuel Cho, MD

Ankur Narain, BA; Fady Hijji, BS; William Long, BA; Krishna Modi, BS; Dustin Massel, BS; Benjamin Mayo, BA; Kern Singh, MD

Ananth Eleswarapu, MD; Srikanth Divi, MD; Lewis Shi, MD; Douglas Dirschl, MD; James Mok, MD; Christopher Stout, PhD; Michael Lee, MD

9:54-9:56 RF Paper 5 What Are the Differences in Medicare DRG Reimbursement for MIS Deformity Surgery in Academic vs Private Hospitals in Different Geographic Regions?
Pierce Nunley, MD; Gregory Mundis, MD; Robert Eastlack, MD; Dean Chou, MD; Christopher Shaffrey, MD; Praveen Mummaneni, MD; International Spine Study Group (ISSG)

9:57 – 10:07 AM DISCUSSION

Rapid Fire Presentations: Complications

10:07-10:09 RF Paper 6 Prevalence of Pre-Operative Lower Urinary Tract Symptoms Among Patients Undergoing Elective Lumbar Spine Surgery
Elizabeth Lieberman, MD; Stephanie Radoslovich, BA; Ryan Boone, BS; Valentina Haj, BS; Jayme Hiratzka, MD; Lynn Marshall, Sc.D.; Jung Yoo, MD

10:10-10:12 RF Paper 7 Risk of Surgical Site Infection and Mortality Following Lumbar Fusion Surgery in patients with Chronic Steroid Usage and Chronic Methicillin Resistant Staphylococcus Aureus (MRSA) infection
Rabia Qureshi, BS; Dennis Chen, MD; Ali Nourbakhsh, MD; Hamid Hassanzadeh, MD; Adam Shimer, MD; Francis Shen, MD; Anuj Singla, MD

10:13-10:15 RF Paper 8 The Risk of Postoperative Surgical Site Infection Following Lumbar Spine Surgery after Exposure to Steroids at the Time of Surgical Intervention
Louis Jenis, MD; Benjamin Cowan, BA

10:16-10:18 RF Paper 9 Associations between Preoperative Hyponatremia and Perioperative Complications in Lumbar Spinal Fusion
Thomas Bomberger, BA; Joseph Tanenbaum, BS; Daniel Lubelski, MD; Michael Steinmetz, MD; Edward Benzel, MD; Thomas Mroz, MD
10:19-10:21 RF Paper 10
Thirty-Day Complications of Navigated Versus Conventional Single-Level Instrumented Posterior Lumbar Fusion: An ACS-NSQIP Analysis
*Patawut Bovonratwet, BS; Stephen Nelson, MD; Nathaniel Ondeck, BS; Benjamin Geddes, MD; Jonathan Grauer, MD*

10:21-10:31 DISCUSSION

Session #5
**Bundled Payments**
Moderators: Alpesh Patel, MD and Theodore Koreckij, MD (10:31 – 10:58)

10:31-10:36 Paper 11
Is There Value in Retrospective 90-day Bundle Payment Models for Lumbar Spine Fusion Procedures?
*Susan Odum, PhD; Bryce Van Doren, MPA, MPH; Leo Spector, MD*

10:37-10:42 Paper 12
Incidence of 90 Day Readmissions Following Posterior Lumbar Fusion
*Jonathan Cui, BS; Raj Gala, MD; Nathaniel Ondeck, BS; Ryan Mc Lynn, BS; Patawut Bovonratwet, BS; Blake Shultz, BA; Jonathan Grauer, MD*

10:43-10:48 Paper 13
90-day bundled payment for primary single level lumbar discectomy/decompression: what does ‘big data’ say?
*Nikhil Jain, MD; Sohrab Virk, MD; Frank Phillips, MD; Elizabeth Yu, MD; Safdar Khan, MD*

10:48-10:58 DISCUSSION

Awards, Grants, and Presidential Address
Moderators: Bruce Darden, MD and Thomas Zdeblick, MD (10:58 - 12:00)

Research Award Announcements
10:58 – 11:00 (2min)
2017 Resident and Fellow PASE Awards

Research Grant Recipients
11:00-11:05 (5min)
LSRS Research Grant: What we’ve gotten for our money
*Bruce V. Darden, II, MD*
*LSRS Research Committee Chair*

11:05-11:08 (3 min)
Announcement: 2017 LSRS Research Grant Award Winner
*Kevin Baker, Ph.D.*
*William Beaumont Hospital*

11:08-11:18 (10min)
2016 Research Grant Recipient Update
*Clinton Devin, MD*
*Vanderbilt University*
“Randomized Clinical Trial to determine Efficacy and Feasibility of Using Predictive Model Based Calculator as a Shared Decision-Making Tool for Lumbar Spine Surgery”

11:18-11:25 (7 Min)
**DISCUSSION**

Transfer of Presidents
Introduction: Thomas Zdeblick, MD
11:25-11:30 (5 min)
*President 2008 - 2011*

11:30-11:55 (25 min)
**PRESIDENTIAL ADDRESS:** Paul A. Anderson, MD, President 2015-2017
11:55 - 12:00 (5 min)  
**Incoming President:** Robert F. Heary, MD, 2017-2019  
*Introduction/Pin Ceremony:* Paul A. Anderson, MD

**12:00-1:00**  
**LUNCH/BUSINESS MEETING**

**Session #6**  
**Deformity 1**  
**Moderators:** Clifford Tribus, MD and D. Kojo Hamilton, MD  
(1:00 – 1:27)  
1:00-1:05 **Paper 14**  
National Trends for Spinal Deformity Surgery throughout the United States  
*Comron Saifi, MD; Joseph Laratta, MD; Joseph Lombardi, MD; Jamal Shillingford, MD; Nathan Hardy, BS; Andrew Pugely, MD; Frank Phillips, MD; Ronald Lehman, MD; Howard An, MD; Lawrence Lenke, MD*

1:06-1:11 **Paper 15**  
A Predictive Nomogram for Clinical Outcomes following Surgical Correction of Adult Spinal Deformity  
*Akshay Sharma, BA; Syed Mehdi, BS; Sagar Vallabh, MS; Emily Hu, BA; Joseph Tanenbaum, BS; Michael Steinmetz, MD; Edward Benzel, MD; Thomas Mroz, MD; Jason Savage, MD*

1:12-1:17 **Paper 16**  
Frailty and Health Related Quality of Life Improvement Following Adult Spinal Deformity Surgery  
*Daniel Reid, MD, MPH; Alan Daniels, MD; Tamir Ailon, MD; Justin Smith, MD; Christopher Shaffrey, MD; Virginie Lafage, PhD; Robert Hart, MD; Emily Miller, MD; Shay Bess, MD; Christopher Ames, MD*

1:17-1:27 **DISCUSSION**

**Session #7**  
**Deformity 2**  
**Moderators:** William Lavelle, MD and Joshua Heller, MD  
(1:27 – 2:00)  
1:27-1:32 **Paper 17**  
Outcomes of Open Staged Corrective Surgery in the Setting of Adult Spinal Deformity  
*Peter Passias, MD; Gregory Poorman, BA; Cyrus Jalai, BA; Breton Line, BS; Bassel Diebo, MD; Samantha Horn, BA; Virginie Lafage, PhD; Shay Bess, MD; Thomas Errico, MD; International Spine Study Group (ISSG)*

1:33-1:38 **Paper 18**  
Visual Loss Following Spine Surgery: What Have We Seen Within the Scoliosis Research Society (SRS) Morbidity and Mortality Database?  
*Jamal Shillingford, MD; Joseph Laratta, MD; Nana Sarpong, MD, MBA; Ronald Lehman, MD; Lawrence Lenke, MD; Charla Fischer, MD*

1:39-1:44 **Paper 19**  
Outcomes of Lumbopelvic Fixation for the Treatment of Adult Deformity with a Modified Iliac Screw Starting Point  
*Ehsan Jazini, MD; Kevin Khalsa, MD; Tristan Weir, BS; Kelley Banagan, MD; Eugene Koh, MD, PhD; Steven Ludwig, MD; Daniel Gelb, MD; Luke Brown, MD*

1:45-1:50 **Paper 20**  
*Jamal Shillingford, MD; Joseph Laratta, MD; Nana Sarpong, MD, MBA; Ronald Lehman, MD; Lawrence Lenke, MD; Charla Fischer, MD*

1:50 – 2:00 **DISCUSSION**
Symposium #2

**Strategies for Management of Persistent Pain After Surgery**

**Moderators:**
Dean Chou, MD

(2:00 – 2:45)

2:00-2:05 (5min)
**Introduction**
Dean Chou, MD

2:05-2:15 (10min)
Structural workup of the patient with persistent pain after surgery
Wellington Hsu, MD

2:15-2:25 (10min)
Interventional therapies for the patient with persistent pain after surgery
Ankit Mehta, MD

2:25-2:35 (10min)
Non-pharmacologic therapies for the patient with persistent pain after surgery
Jason Savage, MD

2:35-2:45 (10 min)
Discussion

**Break**

2:45-3:05

2:45-2:47 **Poster 5**
Radiographic and Clinical Outcomes of Anterior and Transforaminal Lumbar Interbody Fusions: A Systematic Review and Meta-Analysis of Comparative Studies
Remi Ajiboye, MD; Haddy Alas, BA; Akshay Sharma, BA; Sina Pourtaheri, MD

2:48-2:50 DISCUSSION

2:50-2:52 **Poster 6**
Open fixation and fusion versus percutaneous pedicle screw fixation for treatment of thoracolumbar flexion distraction injuries
Assem Sultan, MD; Joseph Drain, MD; Jonathan Belding, MD; Michael Kelly, MD; James Liu, MD; Michael Steinmetz, MD; Timothy Moore, MD

2:53-2:55 DISCUSSION

2:55-2:57 **Poster 7**
Hospital Ownership and Teaching Status Affects Perioperative Outcomes Following Lumbar Spinal Fusion
Wesley Durand, ScB; Joseph Johnson, ScB; Neill Li, BS, MD; JaeWon Yang, BA; Adam Eltorai, BA; J. Mason DePasse, MD; Alan Daniels, MD

2:58-3:00 DISCUSSION

3:00-3:02 **Poster 8**
In Hospital Narcotic Usage Is Significantly Lower for Minimally Invasive Spine Surgery Versus Open Spine Surgery
David Falk, MD Student; Michael Hoy, MD Student; Darshan Vora, MD Student; Natalie Studdard, NP; Warren Yu, MD; Joseph O’Brien, MD, MPH

3:03-3:05 DISCUSSION

Session #8

**Rapid Fire Presentations:** Imaging

**Moderators:**
Louis Jenis, MD and Scott Tromanhauser, MD

(3:05 – 3:55)

3:05-3:07 **RF Paper 11**
The Prevalence of Spinal Epidural Lipomatosis On Magnetic Resonance Imaging
Nina Theyskens, MD; Nuno Paulino Pereira, MD; Stein Janssen, MD; Thomas Cha, MD, MBA; Joseph Schwab, MD, MS
3:08-3:10 **RF Paper 12**

Validating The Clinical Significance of The CARDs Classification For Degenerative Spondylolisthesis Through Preoperative Outcome Measures  
**Rasheed Abiola, MD; Jason Ferrel, MD; Nicholas Spina, MD; W. Ryan Spiker, MD; Brandon Lawrence, MD; Darrel Brodke, MD**

3:11-3:13 **RF Paper 13**

Utility of Supine Lateral Radiographs in Assessment of Lumbar Segmental Instability in Degenerative Lumbar Spondylolisthesis  
**Foster Chen, MD; Sandip Tarpada, BA; Woojin cho, MD, PhD**

3:14-3:16 **RF Paper 14**

2-5 Year Follow Up on S2AI Pelvic Fixation  
**Evan Smith, MD; Justin Kyhos, MD; Robert Dolitsky, MD; Warren Yu, MD; Joseph O’Brien, MD, MPH**

3:17-3:19 **RF Paper 15**

Radiographic Analysis of Psoas Morphology and its Association with Neurovascular Structures at L4-5  
**Philip Louie, MD; Ankur Narain, BA; Fady Hijji, BS; Alem Yacob, MD; Bryce Basques, MD; Kelly Yom, BA; Frank Phillips, MD; Kern Singh, MD**

3:20-3:30 DISCUSSION

**Rapid Fire Presentations: Surgical Techniques**

3:30-3:32 **RF Paper 16**

National Trends in the Utilization of Vertebroplasty and Kyphoplasty Procedures throughout the United States  
**Joseph Laratta, MD; Nathan Hardy, BS; Jamal Shillingford, MD; Joseph Lombardi, MD; James Lin, MD, MS; Comron Saifi, MD; Andrew Pugely, MD; Charla Fischer, MD; Lawrence Lenke, MD; Ronald Lehman, MD**

3:33-3:35 **RF Paper 17**

A Retrospective Study of Thoracolumbar Burst Fractures Treated with Fixation and Non-fusion Surgery of Intra-vertebral Bone Graft Assisted with Balloon Kyphoplasty  
**Chengmin Zhang, PhD; Paul Arnold, MD; Qiang Zhou, MD**

3:36-3:38 **RF Paper 18**

Radiographic Evaluation of Percutaneous Pedicle Screw Constructs Including Minimally Invasive Facet Fusions for Unstable Spinal Column Injuries  
**Daniel Cavanaugh, MD; Tristan Weir, BS; Kelley Banagan, MD; Eugene Koh, MD, PhD; Daniel Gelb, MD; Steven Ludwig, MD; Luke Brown, MD**

3:39-3:41 **RF Paper 19**

Clinical and Radiographic Analysis of Expandable versus Static Lateral Lumbar Interbody Fusion Devices with One-Year Follow-up  
**Joseph O’Brien, MD, MPH; Daina Brooks, BS; Ingrid Luna, MPH; Gita Joshua, MA; Richard Frisch, MD**

3:42-3:44 **RF Paper 20**

National Treatment Trends and Perioperative Outcomes of Surgical Options for Degenerative Spondylolisthesis: An ACS-NSQIP study with comparison to prior LSRS survey results  
**Patawut Bovonratwet, BS; Matthew Webb, AB; Nathaniel Ondock, BS; Jonathan Cui, BS; Ryan McLynn, BS; Kadimcherla Praveen, MD; David Kim, MD; Jonathan Grauer, MD**

3:45-3:55 DISCUSSION

**Session #9**

**Moderators:** Raymond Hah, MD and Gregory Graziano, MD  
(3:55 – 4:22)
3:55-4:00 Paper 21  Bone Morphogenetic Protein Use in Lumbar Spine Surgery in The United States: How Have We Responded to The Warnings?  
Javier Guzman, MD; Robert Merrill, BS; Jun Kim, MD; Samuel Overley, MD; James Dowdell, MD; Sulaiman Samani, BS; Andrew Hecht, MD; Samuel Cho, MD; Sheeraz Qureshi, MD, MBA

4:01-4:06 Paper 22  National Trends in the Utilization of Intraoperative Neuromonitoring throughout the United States  
Joseph Laratta, MD; Nathan Hardy, BS; Jamal Shillingford, MD; Joseph Lombardi, MD; Comron Saifi, MD; Andrew Pugely, MD; Howard An, MD; Frank Phillips, MD; Ronald Lehman, MD; Lawrence Lenke, MD

4:07-4:12 Paper 23  Circumferential Fusion: A Comparative Analysis Between ALIF and TLIF for the Indication of L5-S1 Isthmic Spondylolisthesis  
Erik Tye, BA; Andrea Alonso, BS; Joseph Tanenbaum, BS; Roy Xiao, BA; Thomas Mroz, MD; Michael Steinmetz, MD; Jason Savage, MD

4:12-4:22  DISCUSSION

4:22  Announcements

4:30  Adjourn
**April 7, 2017 - Friday**

7:00 - 7:10  
**Opening Remarks**  
Daniel Sciubba, MD

**Session #10**  
**Minimally Invasive Surgery**  
**Moderators:** Jeffrey Fischgrund, MD and Chi Lim, MD  
(7:10-7:37)

7:10-7:15  
**Paper 24**  
Treatment of Chronic Low Back Pain via Ablation of the Basivertebral Nerve: Results of the SMART Trial  
**Alfred Rhyne, MD; Jeffrey Fischgrund, MD; Rick Sasso, MD; Hyun Bae, MD; Eric Truumees, MD; Philip Yuan, MD; Michael DePalma, MD; Bernhard Meyer, MD; Jorg Franke, MD**

7:16-7:21  
**Paper 25**  
Trend of Spine Surgeries In the Outpatient Hospital Setting vs. Ambulatory Surgical Center  
**Olumuyiwa Idowu, BA; Haroutioun Boyajian, MD; Edwin Ramos, MD; Lewis Shi, MD; Michael Lee, MD**

7:22-7:27  
**Paper 26**  
Body Mass Index is Not Associated with Inpatient Pain Scores or Postoperative Narcotic Consumption following a Minimally Invasive Transforaminal Lumbar Interbody Fusion  
**Ankur Narain, BA; Fady Hijji, BS; Dustin Massel, BS; Benjamin Mayo, BA; Daniel Bohl, MD, MPH; Krishna Kudaravalli, BS; Kelly Yom, BA; Kern Singh, MD**

7:27-7:37  
DISCUSSION

**Session #11**  
**Minimally Invasive Techniques**  
**Moderators:** Tushar Patel, MD and Wellington Hsu, MD  
(7:37-8:04)

7:37-7:42  
**Paper 27**  
An Analysis of Robotic Assisted Pedicle Screw Placement  
**Joseph Lombardi, MD; Joseph Laratta, MD; Jamal Shillingford, MD; Mark Weidenbaum, MD; Ronald Lehman, MD; Charla Fischer, MD**

7:43-7:48  
**Paper 28**  
Postoperative Outcomes Following Primary Minimally Invasive Transforaminal Lumbar Interbody Fusion with Unilateral or Bilateral Interbody Cages  
**Ankur Narain, BA; Fady Hijji, BS; Krishna Kudaravalli, BS; Kelly Yom, BA; Kern Singh, MD**

7:49-7:54  
**Paper 29**  
Lateral lumbar interbody fusion approach and relationship of the ureter: Anatomical study with application to minimizing complications  
**Daniel Drazin, MD, MA; Vlad Voin, NA; Filipe Sanders, NA; Marios Loukas, MD, PhD; Rod Oskouian, MD; R. Tubbs, PhD**

7:54-8:04 AM  
DISCUSSION

**Session #12**  
**Preclinical Studies**  
**Moderators:** Jason Savage, MD and Erin Hsu, PhD  
(8:04- 8:37)

8:04-8:09  
**Paper 30**  
Pain-Related Functional Changes in a Rodent Model of Intervertebral Disc Degeneration  
**Elizabeth Leimer, BS; Matthew Gayoso; Lufang Jing, MS; Adam Elkhayat, BS; Lori Setton, PhD Munish Gupta, MD**

8:10-8:15  
**Paper 31**  
Comparison of the Efficacy of Adipose-Derived and Bone Marrow-Derived Stem Cells in a Rat Model of Spinal Fusion  
**Christina Holmes, PhD; Wataru Ishida, MD; Benjamin Elder, MD, PhD; John Locke; Timothy Witham, MD**
8:16-8:21 **Paper 32**

Intrawound Tobramycin Powder Eradicates Surgical Wound Contamination: An in Vivo Rabbit Study  
*Joseph Laratta, MD; Jamal Shillingford, MD; Nathan Hardy, BS; Joseph Lombardi, MD; Comran Saifi, MD; Alexander Romanov, DVM; Charla Fischer, MD; Ronald Lehman, MD; Lawrence Lenke, MD; K Riew, MD*

8:22-8:27 **Paper 33**

Topical Intraoperative Antibiotic Administration and Fusion: A Comparison of Vancomycin and Tobramycin in a Rat Model.  
*Wataru Ishida, MD; Christina Holmes, PhD; Benjamin Elder, MD, PhD; John Locke; Timothy Witham, MD*

8:27-8:37 AM  
DISCUSSION

**Symposium #3**  
Intra-Operative Imaging/Tools for Lumbar Surgery  
*Moderators: Paul Arnold, MD and Clifford Tribus, MD*  
(8:37 – 9:24)

8:37-8:42  
Introduction  
*Paul Arnold, MD*

8:43-8:53  
Intraoperative Navigation – options and utility  
*David Polly, MD*

8:53-9:03  
Robotics – useful or too early  
*Harvey Smith, MD*

9:03-9:13  
Radiation – minimizing exposure to patient and surgeon  
*Glenn Rechtine, MD*

9:14-9:24  
Discussion  
*(10 min)*

**9:24-9:44**  
**BREAK**

**Breakout Poster Session -3**  
*Moderators: James Harrop, MD and Alexander Ghanayem, MD*

**9:24-9:26 Poster 9**  
Efficacy of Anti-fibrinolytics and When They Reduce Blood Loss During Spinal Deformity Surgery  
*Swamy Kurra, MBBS; Benjamin Meath, BS; Akshay Yadhati, MD; Richard Tallarico, MD; Mike Sun, MD; William Lavelle, MD*

**9:27-9:29**  
DISCUSSION

**9:29-9:31 Poster 10**  
The Use of Liberal Transfusion Triggers: Outcomes after Spine Surgery  
*Taylor Purvis, BS; Rafael De la Garza-Ramos, MD; C. Rory Goodwin, MD, PhD; Steven Frank, MD; Timothy Witham, MD; Daniel Sciubba, MD*

**9:32-9:34**  
DISCUSSION

**9:34-9:36 Poster 11**  
Cigarette Smoke-Induced Inhibition of Osteogenesis Through Involvement of the Aryl Hydrocarbon Receptor  
*Chawon Yun, PhD; Andrew Schneider, MD; Karina Katchko, BS; Gurmit Singh, BS; Jonghwa Yun; Andrew George, BS; Nehal Samra; Sohyun Lee; Wellington Hsu, MD; Erin Hsu, PhD*

**9:37-9:39**  
DISCUSSION
1:10-1:16 Paper 37 An Analysis of Conflicts of Interest in Lumbar Spine Surgery: The Effects of Industry Payments on Practice Patterns and Complication Rates
Gurmit Singh, BS; Ralph Cook, BS; Joseph Weiner, BS; Michael Schallmo, BS; Danielle Chun, MD; Sameer Singh, BS; Kathryn Barth, BS; Alpesh Patel, MD, FACS; Wellington Hsu, MD

1:17-1:22 Paper 38 Hospital Competitive Intensity Predicts Perioperative Outcomes Following Lumbar Spinal Fusion
Wesley Durand, ScB; Joseph Johnson, ScB; Neil Li, BS, MD; JaeWon Yang, BA; Adam Eltorai, BA; J. Mason DePasse, MD; Alan Daniels, MD

1:23-1:27 Paper 39 Discriminative Ability of Commonly Used Comorbidity Indices: A Comparison of ASA, the modified Charlson Comorbidity Index, and the modified Frailty Index
Nathaniel Ondeck, BS; Daniel Bohl, MD, MPH; Patarut Bovonratwet, BS; Ryan McLynn, BS; Jonathan Cui, BS; Blake Shultz, BA; Adam Lukasiewicz, MSc; Jonathan Grauer, MD

1:28-1:33 DISCUSSION

Session #15 Lumbar Degenerative
Moderators: Michael Lee, MD and Hemil Maniar, MD
(10:38 – 11:08)
1:38-1:43 Paper 40 Comparative Effectiveness between Primary and Revision Foraminotomy for the Treatment of Lumbar Foraminal Stenosis
Emily Hu, BA; Jianning Shao, BA; Heath Gould, BA; Roy Xiao, BA; Colin Haines, MD; Don Moore, MD; Thomas Mroz, MD; Michael Steinmetz, MD

1:39-1:41 Poster 12 Minimally invasive retroperitoneal anterolateral psoas-sparing (ATP) lumbosacral fusion: Is it safe?
Chadi Tannoury, MD; Tony Tannoury, MD; Brian Mercer, MD

1:42-1:44 DISCUSSION

SESSION #13 Patient Satisfaction
Moderator: Shah-Nawaz Dodwad, MD and Seth Williams, MD
(9:44 – 10:11)
9:44-9:49 Paper 34 The Effectiveness of Personalized Electronic Patient Engagement Messaging Following Lumbar Spinal Fusion: A Pilot Study
Louis Jenis, MD; Tricia Gordon, NP; Thomas Cha, MD, MBA; Joseph Schwab, MD, MS

9:50-9:55 Paper 35 Preoperative Mental Health May Not Be Predictive of Improvements in Patient Reported Outcomes Following a Minimally Invasive Transforaminal Lumbar Interbody Fusion
Fady Hijji, BS; Ankur Narain, BA; Benjamin Mayo, BA; Dustin Massel, BS; Daniel Bohl, MD, MPH; Kelly Yom, BA; Krishna Kudaravalli, BS; Kern Singh, MD

9:56-10:01 Paper 36 Validation and Utility of the Patient Reported Outcomes Measurement Information System (PROMIS®) in Patients with Lumbar Stenosis with or without Spondylolisthesis
Hemil Maniar, MD; Wellington Hsu, MD; Surabhi Bhatt, BS; Jason Savage, MD; Alpesh Patel, MD, FACS

10:11-10:11 DISCUSSION

Session #14 Outcomes / Policy
Moderators: Timothy Moore, MD and Douglas Orndorff, MD
(10:11 – 10:38)
Gurmit Singh, BS; Ralph Cook, BS; Joseph Weiner, BS; Michael Schallmo, BS; Danielle Chun, MD; Sameer Singh, BS; Kathryn Barth, BS; Alpesh Patel, MD, FACS; Wellington Hsu, MD

10:17-10:22 Paper 38 Hospital Competitive Intensity Predicts Perioperative Outcomes Following Lumbar Spinal Fusion
Wesley Durand, ScB; Joseph Johnson, ScB; Neill Li, BS, MD; JaeWon Yang, BA; Adam Eltorai, BA; J. Mason DePasse, MD; Alan Daniels, MD

10:23-10:28 Paper 39 Discriminative Ability of Commonly Used Comorbidity Indices: A Comparison of ASA, the modified Charlson Comorbidity Index, and the modified Frailty Index
Nathaniel Ondeck, BS; Daniel Bohl, MD, MPH; Patarut Bovonratwet, BS; Ryan McLynn, BS; Jonathan Cui, BS; Blake Shultz, BA; Adam Lukasiewicz, MSc; Jonathan Grauer, MD

10:28-10:38 DISCUSSION
10:44-10:51 **Paper 41**
Decompression Versus Fusion for Grade I Degenerative Spondylolisthesis: A Meta-Analysis
Scott Koenig, BS; Julio Juaregui, MD; Mark Shasti, MD; Luke Brown, MD; Steven Ludwig, MD; Daniel Gelb, MD; Kelley Banagan, MD; Eugene Koh, MD, PhD

10:52-10:57 **Paper 42**
Effect of Lumbar Fusion on Adjacent Segment Disc Deformation: an In-Vivo Pre and Post-Fusion Surgery Patient Analysis
Thomas Cha, MD, MBA; Kamran Khan, MS; Yan Yu, MD, PhD; Kirkham Wood, MD; Guoan Li, PhD

10:58-11:08 **DISCUSSION**

**Session #16**
**Rapid Fire Presentations - Preclinical Studies / Other**
Moderators: Robert F. Heary, MD and Ankit Mehta, MD
(11:08 – 12:00)

11:08-11:10 **RF Paper 21**
Combined Treatment with High-Dose Parathyroid Hormone (PTH 1-34) and Low Dose Bone Morphogenetic Protein 2 (BMP-2) in a Rabbit Spinal Fusion Model
Christina Holmes, PhD; Benjamin Elder, MD, PhD; Wataru Ishida, MD; Sheng-Fu Lo, MD; Maritza Taylor, BA; John Locke; Timothy Witham, MD

11:11-11:13 **RF Paper 22**
Intradiscal Injection of Polymethyl-Methacrylate/Hyaluronic Acid in an Ovine Model of Degenerative Disc Disease: Long-Term Disc Appearance on MRI
Arvin Wali, BA; David Santiago-Dieppa, MD; Reid Hoshide, MD; Natalie Taylor, BS; Gloria Lin, PhD; Nick Manesis, PhD; William Taylor, MD

11:14-11:16 **RF Paper 23**
Tissue Engineered Bone Graft with Hypertrophic Chondrocytes Prevents Fusion in an Athymic Rat Model
Comron Saifi, MD; Joseph Laratta, MD; Jamal Shillingford, MD; Jonathan Bernhard, PhD; Petros Petridis; Samuel Robinson, BS; Mark Weidenbaum, MD; Ronald Lehman, MD; Gordana Vunjak-Novakovic, MS, PhD; Lawrence Lenke, MD

11:17-11:19 **RF Paper 24**
The Role of Calcium Pyrophosphate Dihydrate Deposition in Postoperative Outcome of Lumbar Spinal Stenosis Patients
Thanase Ariyawatkul, MD; Panya Luksanapruska, MD; Witchate Pichaisak, MD; Cholavech Chavasiri, MD; Sirichai Wilaratratsami, MD; Visit Vamvanij, MD

11:20-11:22 **RF Paper 25**
Treatment of the Fractional Curve with Circumferential Minimally Invasive (cMIS) Interbody versus Open Surgery: An Analysis of Surgical Outcomes
Dean Chou, MD; Praveen Mummaneni, MD; Pierce Nunley, MD; Robert Eastlack, MD; Stacie Nguyen, MPH; Gregory Mundis, MD; International Spine Study Group (ISSG)

11:23-11:33 **DISCUSSION**

**Rapid Fire Presentations - Deformity**

11:34-11:36 **RF Paper 26**
Radiographic Sagittal Alignment in the Asymptomatic Elderly: What is Normal for Age?
David McConda, MD; Susan Odum, PhD; Todd Chapman, MD; P. Brad Segebarth, MD

11:37-11:39 **RF Paper 27**
Effect of Lumbosacral Fusion Alignment on the Biomechanics of the Proximal Lumbar Segments in Standing and Sitting Postures
Avinash Patwardhan, PhD; Saeed Khayatzadeh, PhD; Antonio Faundez, MD; Robert Havey, MS; Leonard Voronov, MD, PhD; Alexander Ghanayem, MD; Jean-Charles Le Huec, MD

11:40-11:42 **RF Paper 28**
Utility of Intraoperative Rotational Thromboelastometry in Thoracolumbar Deformity Surgery
Jian Guan, MD; Meic Schmidt, MD, MBA; Andrew Dailey, MD
11:43-11:45 RF Paper 29  
Cost Implications of Primary versus Revision surgery in Adult Spinal Deformity  
*Rabia Qureshi, BS; Varun Puvanesarajah, BS; Amit Jain, MD; Khaled Kebaish, MD; Adam Shimer, MD; Francis Shen, MD; Hamid Hassanzadeh, MD*

11:46-11:48 RF Paper 30  
A Spine in Limbo: Does the Difference Between Standing and Supine Spino-Pelvic Measurements of Patients With Adult Spinal Deformity Affect Surgical Decision Making?  
*Khushdeep Vig, BA; Awais Hussain, BA; Robert Merrill, BS; Jun Kim, MD; James Dowdell, MD; Nathan Lee, BS; John Di Capua, MHS, BS; Samantha Jacobs, BA; Chierika Ukogu, BA; Samuel Cho, MD*

11:49-12:00 DISCUSSION

12:00  
Closing remarks

12:05pm Adjourn

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*Comron Saifi, MD; Joseph Laratta, MD; Andrew Pugley, MD; Alejandro Cazzulino, BA; Edward Goldberg, MD; Ronald Lehman, MD; Lawrence Lenke, MD; Howard An, MD; Frank Phillips, MD*

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*90-day reimbursements for primary single level posterior lumbar interbody fusion from commercial and Medicare data*  
*Nikil Jain, MD; Frank Phillips, MD; Safdar Khan, MD*

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*Jason Ferrel, MD; Chong Zhang, MS; Angela Presson, PhD; Rasheed Aibiola, MD; Nicholas Spina, MD; W. Ryan Spiker, MD; Brandon Lawrence, MD; Darrel Brodke, MD*

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*Mathieu Squires, BS; Ashley Neese, BS; Yue Zhang, PhD; Brandon Lawrence, MD; W. Ryan Spiker, MD; Darrel Brodke, MD*

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*Remi Ajiboye, MD; Haddy Alas, BA; Akshay Sharma, BA; Sina Pourtaheri, MD*
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Wesley Durand, ScB; Joseph Johnson, ScB (2018); Neill Li, BS, MD; JaeWon Yang, BA; Adam Eltorai, BA; J. Mason DePasse, MD; Alan Daniels, MD

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SCIENTIFIC PROGRAM

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Christian Fisahn, MD; Shiveindra Jayamohan, MD; Daniel Norvell, PhD; R. Tubbs, PhD; Marc Moisi, MD; Jens Chapman, MD; Jeni Page, ACNP-BC; Rod Oskouian, MD

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Daniel Lubelski, MD; Joseph Tanenbaum, BS; Taylor Purvis, BS; Thomas Bomberger, BA; C. Rory Goodwin, MD/PhD; Daniel Sciubba, MD

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**Evaluating the Effect of Growing Patient Numbers and Changing Data Elements in the National Surgical Quality Improvement Program (NSQIP) Database Over the Years: A Study of Lumbar Fusions**

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**Total Disc Arthroplasty and Anterior Interbody Fusion in the Lumbar Spine Have Relatively Similar Short-Term Outcomes**

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Alejandro Cazzulino, BA; Comron Saifi, MD; Melvin Makhni, MD; Matthew Colman, MD; Christopher Dewald, MD; Ronald Lehman, MD; Howard An, MD; Frank Phillips, MD

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Permsak Paholpak, MD; Emin Dedeogullari; Koji Tamai, MD; Kaku Barkoh, MD; Kittipong Sessumpun, MD; Jeffrey Wang, MD; Zorica Buser, PhD

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**Continued Inpatient Care After Posterior Lumbar Fusion Is Associated With Increased Post-Discharge Complications: A Propensity-Adjusted Analysis**

Andre Samuel, BBA; Michael Fu, MD; William Schairer, MD; Peter Derman, MD; Alexander McLawhorn, MD; Todd Albert, MD